



REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
**OFFICE OF THE SURGEON GENERAL**  
5109 LEESBURG PIKE  
FALLS CHURCH, VA 22041-3258

DASG-PPM

16 November 2005

**MEMORANDUM FOR SEE DISTRIBUTION**

**SUBJECT: Army Cold Weather Injury Prevention Guidance, 2005-2006**

1. Cold weather injury prevention is a command responsibility. As medical advisors to Army commanders and leaders, you are responsible for developing guidance to prevent cold weather injury. Enclosed is guidance on early identification, risk reduction, and reporting of cold weather injuries (Enclosure 1).
2. From July 1998 to June 2005, more than 2,000 cold injuries were reported among Soldiers, including over 1000 frostbite cases (Enclosure 2). Even in non-freezing temperatures, cold weather injuries can occur; therefore, it is important to take measures to prevent trench foot among our Soldiers.
3. Technical Bulletin Medical 508 (TB MED 508), Prevention and Management of Cold-Weather Injuries provides detailed guidance to healthcare providers and unit commanders and leaders in preventing cold injuries.
4. Our points of contact are Mr. Paul Repaci, Office of The Surgeon General, DSN 761-2949, Commercial (703) 681-2949, or e-mail [Paul.Repaci@otsg.amedd.army.mil](mailto:Paul.Repaci@otsg.amedd.army.mil); and Mr. Terrence Lee, U.S. Army Center for Health Promotion and Preventive Medicine, DSN 584-2464, Commercial (410) 436-2464, or e-mail [Terrence.Lee@us.army.mil](mailto:Terrence.Lee@us.army.mil).

FOR THE SURGEON GENERAL:

MICHAEL B. CATES  
Brigadier General, VC  
Functional Proponent for Preventive Medicine

2 Encls

1. 2005-2006 CWI Prevention Guidance
2. Cold Weather Injuries, 1998-2005

DASG-PPM

SUBJECT: Army Cold Weather Injury Prevention Guidance, 2005-2006

DISTRIBUTION:

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Surgeon, U.S. Army Special Operations Command, Fort Bragg, NC 28307-5200

## 2005-2006 Cold Weather Injury (CWI) Prevention

### 1. References:

- a. TB MED 508 Prevention and Management of Cold Weather, April 2005  
USACHPPM website: <http://chppm-www.apgea.army.mil/coldinjury/>.
- b. USACHPPM-produced cold weather injury prevention information and training aid products, <http://chppm-www.apgea.army.mil/coldinjury/>.
- c. DeGroot, D.W., J.W. Castellani, J. Williams, and P.J. Amoroso. Epidemiology of US Army cold weather injuries, 1980-1999. Aviation, Space, and Environmental Medicine 74: 564-570, 2003.
- d. FM 100-14, Risk Management, 23 April 1998.
- e. Countermeasure Magazine, "Family of Space Heaters (FOSH)—Emphasis on Safety," Joseph Mackoul, October 2003.  
<https://crc.army.mil/MediaAndPubs/detail.asp?iData=22&iCat=69&iChannel=19&nChannel=MediaAndPubs>.  
Countermeasure Magazine, "Cold Hurts!," Julie Shelley, September 2005.  
[https://crc.army.mil/MediaAndPubs/magazines/countermeasure/2005\\_issues/cmsep05.pdf](https://crc.army.mil/MediaAndPubs/magazines/countermeasure/2005_issues/cmsep05.pdf)
- f. USACHPPM Fact Sheet 55-007-1003 (Oct 03), "*Guidance on the Use of Heaters inside Tents and Other Enclosed Shelters*," has been revised as USACHPPM Fact Sheet 55-007-1005 (Oct 05), <http://chppm-www.apgea.army.mil/documents/fact/heaters-JusttheFacts05finalw-links.pdf>. This fact sheet can also be found at the USACHPPM web site (<http://chppm-www.apgea.army.mil/>), under USACHPPM fact sheets, <http://chppm-www.apgea.army.mil/fs.htm>.
- g. Commanders' Smart Book Equipment Catalog, April 2005, RDECOM, Natick Soldier Center: [http://www.natick.army.mil/soldier/media/print/Smartbook\\_Web.pdf](http://www.natick.army.mil/soldier/media/print/Smartbook_Web.pdf).

2. Guidance on prevention and management of cold weather injuries (CWIs) found in reference 1a is supplemented by information and training aid products in references 1b, 1c, and in appendices 1-4 in this enclosure.

a. Appendix 1 is a risk management guide to assist commanders and leaders in preventing or mitigating CWIs.

(1) A comprehensive cold weather injury prevention program should follow Army principles of risk management (reference 1d, above) by identifying hazards, assessing hazards in terms of severity and probability, developing and implementing controls, and supervising and evaluating control measures. Units train using these risk management principles; therefore, it is imperative that commanders/leaders use this methodology.

b. Appendix 2 provides clinical guidance for case classification and reporting requirements.

(1) Military treatment facilities (MTFs) are required to report all cases of CWI to the Army Medical Surveillance Activity (AMSA) as part of the Reportable Medical Events System (RMES) (<http://amsa.army.mil>). Preventive Medicine (PM) personnel at supporting MTFs should receive local reports of possible CWIs, investigate and compile required information, and report injuries electronically through the RMES.

(2) PM personnel should coordinate with appropriate unit or organizational safety officers so that CWI data are also reported through Army Safety channels.

c. Appendix 3 provides general guidance that commanders and leaders should use when planning for physical fitness training in cold weather environments.

d. Appendix 4 provides the Wind Chill Temperature Table adopted in 2001 by the Air Force Weather Agency for use at military installations worldwide. Frostbite can occur anytime temperatures fall below freezing; however, the risk and severity increases with prolonged exposure at lower temperatures and greater wind speeds.

5. Consult references 1e through 1g for information on the use and procurement of space heaters for tents and other enclosed shelters.

a. The Army approved a Family of Space Heaters (FOSH) for heating tents safely, and efficiently. These newly developed heaters use the latest advances in combustion, power generation, and microprocessor technology to replace the World War II-vintage M-1941 potbelly and M-1950 Yukon heaters.

b. The CHPPM fact sheet (see reference 1f) provides guidance on use of heaters inside tents and other enclosures. The Countermeasure Magazine articles (see reference 1e) published by the US Army Combat and Readiness Center provides information to Soldiers on the new family of space heaters (Oct 2003) and an overview of the types of hazards seen during cold-weather operations (Sep 2005).

#### Appendices:

1. Risk Management Steps for Preventing Cold Casualties
2. Clinical Guidance for Case Classification and Reporting Requirements
3. General Guidance for Cold-Weather Physical Fitness Training (PT)
4. Wind Chill Temperature Table adopted in 2001 by the Air Force Weather Agency

# Appendix 1

## Unit Leader's and Instructor's Risk Management Steps for Preventing Cold Casualties

**RISK MANAGEMENT IS THE PROCESS OF IDENTIFYING AND CONTROLLING HAZARDS TO PROTECT THE FORCE**

### Possible Outcomes of Inadequate Climatic Cold Management:

- |   |  |
|---|--|
| ↳ <b>Chilblain</b><br>(due to bare skin exposed to cold, humid air) | ↳ <b>Hypothermia</b><br>(whole body temperature dangerously low) |
| ↳ <b>Immersion Foot (Trench Foot)</b><br>(due to wet feet)          | ↳ <b>Dehydration</b>   |
| ↳ <b>Frostbite</b> (freezing of tissue and body parts)              | ↳ <b>Snow Blindness</b>  |
|   | ↳ <b>Carbon Monoxide Poisoning</b>                               |

## THE FIVE STEPS OF RISK MANAGEMENT ARE:

# 1

### Identify Hazards

- |  |  |
|--|--|
| ↳ Cold (temperature 40°F and below)              | ↳ Other Risk Factors include:                          |
| ↳ Wet (rain, snow, ice, humidity) or wet clothes | • Previous cold injuries or other significant injuries |
| ↳ Wind (wind speed 5 mph and higher)             | • Use of tobacco/nicotine or alcohol                   |
| ↳ Lack of adequate shelter/clothing              | • Skipping meals/poor nutrition                        |
| ↳ Lack of provisions/water                       | • Low activity   |
|  | • Fatigue/sleep deprivation                            |
|  | • Little experience/training in cold weather           |
|  | • Cold casualties in the previous 2-3 days             |

# 2

### Assess Hazards

**Follow the Wind Chill Temperature Table to Determine the Danger Level**

**Do individuals have adequate shelter/clothing?**

- ↳ Are clothes clean without stains, holes or blemishes (which could decrease heat-retaining function)?

**Have meals been consumed?**

- ↳ Are meals warm?

**Are there other circumstances?**

- ↳ Is there contact with bare metal or fuel/POL (petroleum, oils or lubricants)?
- ↳ Is the environment wet? Is there contact with wet materials or wet ground?
- ↳ Can Soldier move around to keep warm?
- ↳ Are feet dry and warm?
- ↳ Is the Soldier with a buddy who can assist/watch over to prevent cold injuries?

# 2

## ASSESS HAZARDS CONTINUED

### USING THE WIND CHILL TEMPERATURE TABLE

The wind chill index (see table below) gives the equivalent temperature of the cooling power of wind on exposed flesh.

- ☞ Any movement of air (running, riding in open vehicles, or helicopter downwash) has the same effect as wind.
- ☞ Any dry clothing (mittens, scarves, masks) or material which reduces wind exposure will help protect the covered skin.

Trench foot injuries can occur at any point on the wind chill chart and -

- ☞ Are much more likely to occur than frostbite at higher wind chill temperatures, especially on extended exercises/missions and/or in wet environments.
- ☞ Can lead to permanent disability, just like frostbite.



### Wind Chill Chart



		Temperature (°F)																	
Wind (mph)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times

30 minutes

10 minutes

5 minutes

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V<sup>0.16</sup>) + 0.4275T(V<sup>0.16</sup>)

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

# 3

## CONTROL HAZARDS

### MAIN POINTS TO STRESS TO SOLDIERS

When using Cold-Weather Clothing, Remember . . .

**C-O-L-D**    Keep it..... **C**lean  
                  Avoid..... **O**verheating  
                  Wear it..... **L**oose in layers  
                  Keep it ..... **D**ry

### MAIN POINTS TO STRESS TO LEADERS

Follow these **Wind Chill Preventive Medicine Measures based on Wind Chill Temperature**

- 30°F and below**    Alert personnel to the potential for cold injuries
- 25°F and below**    Leaders inspect personnel for wear of cold weather clothing. Provide warm-up tents/areas/hot beverages.
- 0°F and below**    Leaders inspect personnel for cold injuries. Increase the frequency of guard rotations to warming areas. Discourage smoking.
- 10°F and below**    Initiate the buddy system. Have personnel check each other for cold injuries.
- 20°F and below**    Consider modifying or curtailing all but mission-essential field operations.

**NOTE: TRENCH FOOT can occur at any temperature - Always Keep Feet Warm and Dry**

### GENERAL GUIDANCE FOR ALL COLD-WEATHER TRAINING

**Skin:** Exposed skin is more likely to develop frostbite, therefore cover skin. Avoid wet skin (common around the nose and mouth). Inspect hands, feet, face and ears frequently for signs of frostbite.

**Clothing:** Soldiers must change into dry clothing at least daily and whenever clothing becomes wet. Soldiers must wash and dry feet and put on dry socks at least twice daily.

**Nutrition:** 4500 calories / day / soldier. Equivalent to 3 meal packets in meal-cold weather (MCW) or 3-4 MRE's.

**Hydration:** 3-6 Liters (canteens) / day / soldier. Warm, sweet drinks are useful for re-warming.

**Camouflage:** Obscures detection of cold injuries; not recommended below 32°F.

**Responsibilities:** Soldiers are responsible for preventing individual cold injuries. Unit NCO's are responsible for the health and safety of their troops. **Cold injury prevention is a command responsibility.**

# 3

## Control Hazards continued

### Personal Protection

#### Ensure Appropriate Clothes and Proper Wearing of Clothes –

- ⌚ Wear clothing loose and in layers.
- ⌚ Ensure all clothing is clean.
- ⌚ Ensure proper boots are worn and are dry.
- ⌚ Ensure clothes do not have holes, broken zippers, etc.
- ⌚ Ensure hands, fingers, and head are covered and protected.
- ⌚ Avoid spilling liquids on skin or clothes. Liquid stains will reduce clothing's protective properties.
- ⌚ Change wet, damp clothes ASAP.

#### Keep Body Warm

- ⌚ Keep moving.
- ⌚ Exercise big muscles (arms, shoulders, trunk, and legs) to keep warm.
- ⌚ Avoid alcohol use (alcohol impairs the body's ability to shiver).
- ⌚ Avoid standing on cold, wet ground.
- ⌚ Avoid tobacco products which decrease blood flow to skin.
- ⌚ Eat all meals to maintain energy.
- ⌚ Drink water or warm non-alcoholic fluids to prevent dehydration.

#### Protect Feet

- ⌚ Keep socks clean and dry.
- ⌚ Wash feet daily, if possible.
- ⌚ Carry extra pairs of socks.
- ⌚ Change wet or damp socks ASAP; use foot powder on feet and boots.
- ⌚ Avoid tight socks and boots; do not over-tighten boot or shoes.
- ⌚ Wear overshoes to keep boots dry.

#### Protect Hands

- ⌚ Wear gloves, mittens, or gloves/mittens with inserts.
- ⌚ Warm hands under clothes if they become numb.
- ⌚ Avoid skin contact with snow, fuel or bare metal. Wear proper gloves when handling fuel or bare metal.
- ⌚ Waterproof gloves by treating with waterproofing compounds.



# 3

## CONTROL HAZARDS CONTINUED

### PERSONAL PROTECTION CONTINUED

#### Protect Face and Ears

- ⌚ Cover face and ears with scarf. Wear insulated cap with flaps over ears or balaclava.
- ⌚ Warm face and ears by covering them with your hands. Do NOT rub face or ears.
- ⌚ Face camouflage paint should not be used when air temperature is below 32°F.
- ⌚ Wear sunscreen.

#### Protect Your Eyes

- ⌚ Wear sunglasses to prevent snow blindness.
- ⌚ If sunglasses are not available, protective slit goggles can be made from cutting slits in cardboard (e.g., MRE cardboard box).

#### Protect Each Other

- ⌚ Watch for signs of frostbite and other cold weather injuries in your buddy.
- ⌚ Ask about and assist with re-warming of feet, hand, ears or face.

#### Prevent Carbon Monoxide Poisoning

- ⌚ Use only Army-approved heaters in sleeping areas.
- ⌚ Do not sleep near exhaust of a vehicle while vehicle is running .
- ⌚ Do not sleep in enclosed area where an open fire is burning.

### LEADERSHIP CONTROLS

- ⌚ Discontinue/limit activities/exercise during very cold weather.
- ⌚ Use covered vehicles for troop transport.
- ⌚ Have warming tents available.
- ⌚ Have warm food and drink readily available.

### FACILITY CONTROLS

- ⌚ Use only Army-authorized heaters. (i.e., no kerosene or propane heaters).
- ⌚ Ensure heaters are in working order and adequately ventilated.
- ⌚ Ensure integrity of shelters for maximum protection from the cold.

# 4

## IMPLEMENT CONTROLS

- ↳ Identified controls are in place
- ↳ Controls are integrated into SOPs
  - Educate soldiers of hazards and controls (including newly arrived soldiers)
  - Implement buddy system to check clothes/personal protection
- ↳ Decision to accept risk is made at appropriate level
- ↳ Buddy System to check each other
- ↳ Self Checks

# 5

## SUPERVISE AND EVALUATE

- ↳ Ensure all soldiers are educated about prevention, recognition and treatment of cold weather injuries.
- ↳ Delegate responsibilities to ensure control measures have been implemented.
- ↳ Monitor adequacy/progress of implementation of control measures.
- ↳ Do frequent spot checks of clothes, personal protection and hydration.
- ↳ Record and monitor indicators of increasing cold risks, for example:
  - Increasing number of cold weather injuries
  - Increased complaints/comments about cold
  - Observations of shivering, signs of cold weather injuries
- ↳ Evaluate current control measures and strategize new or more efficient ways to keep warm and avoid cold injuries



Oct 2005

See <http://chppm-www.apgea.army.mil/coldinjury>  
for electronic versions of this document and other resources

### Cold Weather Casualties and Injuries Chart

- Train soldiers on the proper use of cold weather clothing
- Remember the acronym C-O-L-D when wearing clothing in cold weather  
(C: keep it Clean; O: avoid Overdressing; L: wear clothing Loose and in layers; D: keep clothing Dry)
- Maintain adequate hydration and ensure nutritional requirements are met

Cold Weather Casualties and Injuries			
Chilblain			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> <li>■ Repeated exposure of bare skin for prolonged periods from 20°-60°F with high humidity (for those not acclimated to cold weather).</li> </ul>	<ul style="list-style-type: none"> <li>■ Swollen, red skin (or darkening of the skin in dark-skinned soldiers).</li> <li>■ Tender, hot skin, usually accompanied by itching.</li> </ul>	<ul style="list-style-type: none"> <li>■ Warm affected area with direct body heat.</li> <li>■ Do not massage or rub affected areas.</li> <li>■ Do not wet the area or rub it with snow or ice.</li> <li>■ Do not expose affected area to open fire, stove, or any other intense heat source.</li> </ul>	<ul style="list-style-type: none"> <li>■ Use contact gloves to handle all equipment; never use bare hands to handle equipment, especially metal.</li> <li>■ Use approved gloves to handle all fuel and POL* products.</li> <li>■ In the extreme cold environment, do not remove clothing immediately after heavy exertion (PT); until you are in a warmer location.</li> <li>■ Never wear cotton clothing in the cold weather environment.</li> </ul>
Immersion foot (trench foot)			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> <li>■ Prolonged exposure of feet to wet conditions 32°-60°F. Inactivity and damp socks and boots (or tightly laced boots that impair circulation) speed onset and severity.</li> </ul>	<ul style="list-style-type: none"> <li>■ Cold, numb feet may progress to hot with shooting pains.</li> <li>■ Swelling, redness, and bleeding.</li> </ul>	<ul style="list-style-type: none"> <li>■ If you suspect trench foot, get medical help <b>immediately!</b></li> <li>■ Re-warm feet by exposing them to warm air.</li> <li>■ Do not allow victim to walk on injury.</li> <li>■ Evacuate victim to a medical facility.</li> <li>■ Do not massage, rub, moisten, or expose affected area to extreme heat.</li> </ul>	<ul style="list-style-type: none"> <li>■ Keep feet clean and dry; change wet or damp socks as soon as possible.</li> <li>■ Wet or damp socks should be dried as soon as possible to allow them to be re-used.</li> <li>■ The inside of Vapor Barrier boots should be wiped dry once per day, or more often as feet sweat.</li> <li>■ Dry leather boots by stuffing with paper towels.</li> </ul>
Frostbite			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> <li>■ Freezing of tissue. e.g.: fingers, toes, ears, and other facial parts.</li> <li>■ Exposure to bare skin on metal, extremely cool fuel and POL*, wind chill, and tight clothing - particularly boots - can make the problem worse.</li> </ul>	<ul style="list-style-type: none"> <li>■ Numbness in affected area.</li> <li>■ Tingling, blistered, swollen, or tender areas.</li> <li>■ Pale, yellowish, waxy-looking skin (grayish in dark-skinned soldiers).</li> <li>■ Frozen tissue that feels wooden to the touch.</li> </ul>	<ul style="list-style-type: none"> <li>■ <b>Frostbite can lead to amputation! Evacuate immediately!</b></li> <li>■ Start first-aid immediately. Warm affected area with direct body heat.</li> <li>■ Do not thaw frozen areas if treatment will be delayed.</li> <li>■ Do not massage or rub affected areas.</li> <li>■ Do not wet the area or rub it with snow or ice.</li> <li>■ Do not expose affected area to open fire, stove, or any other intense heat source.</li> </ul>	<ul style="list-style-type: none"> <li>■ Use contact gloves to handle all equipment; never use bare hands to handle equipment.</li> <li>■ Use approved gloves to handle fuel and POL*.</li> <li>■ Never wear cotton clothing in the cold weather environment.</li> <li>■ Keep face and ears covered and dry.</li> <li>■ Keep socks clean and dry.</li> <li>■ Avoid tight socks and boots.</li> </ul>
Hypothermia			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> <li>■ Prolonged cold exposure and body-heat loss. May occur at temperatures well above freezing, especially when a person is wet.</li> </ul>	<ul style="list-style-type: none"> <li>■ Shivering may or may not be present.</li> <li>■ Drowsiness, mental slowness or lack of coordination. Can progress to unconsciousness, irregular heartbeat, and death.</li> </ul>	<ul style="list-style-type: none"> <li>■ This is the most serious cold exposure medical emergency and can lead to death! Get the soldier to a medical facility as soon as possible!</li> <li>■ Even if a victim is cold and is not breathing, never assume someone is dead until determined by medical authorities!</li> <li>■ Strip off wet clothing and wrap victim in blankets or a sleeping bag.</li> <li>■ Place another person in sleeping bag as an additional heat source.</li> <li>■ For the person with unconsciousness and very low heartbeat, minimize handling of the victim so as to not induce a heart attack.</li> </ul>	<ul style="list-style-type: none"> <li>■ Never wear cotton clothing in the cold weather environment.</li> <li>■ Anticipate the need for warming areas for soldiers exposed to cold, wet conditions.</li> </ul>
Additional Medical Considerations in the Cold Weather environment:			
Dehydration			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> <li>■ Depletion of body fluids.</li> </ul>	<ul style="list-style-type: none"> <li>■ Dizziness.</li> <li>■ Weakness.</li> <li>■ Blurred vision.</li> </ul>	<ul style="list-style-type: none"> <li>■ Replace lost water. Water should be sipped, not gulped.</li> <li>■ Get medical treatment.</li> </ul>	<ul style="list-style-type: none"> <li>■ At a minimum drink 3-6 quarts of fluid per day.</li> </ul>
Snow Blindness			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> <li>■ Burning of the cornea of the eye by exposure to intense UV rays of the sun in a snow-covered environment.</li> </ul>	<ul style="list-style-type: none"> <li>■ Pain, red, watery or gritty feeling in the eyes.</li> </ul>	<ul style="list-style-type: none"> <li>■ Rest and total darkness; bandage eyes with gauze.</li> <li>■ Evacuate if no improvement within 24 hours.</li> </ul>	<ul style="list-style-type: none"> <li>■ Use sunglasses with side protection in a snow-covered environment.</li> <li>■ If sunglasses are not available use improvised slit glasses.</li> </ul>
Carbon Monoxide Poisoning			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> <li>■ Replacement of oxygen with carbon monoxide in the blood stream caused by burning fuels without proper ventilation.</li> </ul>	<ul style="list-style-type: none"> <li>■ Headache, confusion, dizziness, excessive yawning.</li> <li>■ Cherry red lips and mouth, grayish tint to lips and mouth (in dark-skinned individuals).</li> <li>■ Unconsciousness.</li> </ul>	<ul style="list-style-type: none"> <li>■ Move to fresh air.</li> <li>■ CPR if needed.</li> <li>■ Administer oxygen if available. Evacuate.</li> </ul>	<ul style="list-style-type: none"> <li>■ Use only Army-approved heaters in sleeping areas and ensure that personnel are properly licensed to operate the heaters.</li> <li>■ Never sleep in running vehicles.</li> <li>■ Always post a fire guard when operating a heater in sleeping areas.</li> </ul>

\*POL – Petroleum, oil or lubricants

# Avoid Cold Casualties!

When using Cold-Weather Clothing,  
Remember **C-O-L-D**

**C** ~ Keep it...Clean

**O** ~ Avoid...Overheating

**L** ~ Wear it...Loose and in Layers

**D** ~ Keep it...Dry

Notify an instructor / leader,  
if you or your buddy experience -

## In cold environments ...

### Effects to the skin, such as:

- Swollen red or darkened
- Pain, tenderness, hot or itchy
- Numbness or tingling
- Bleeding or blistered
- Gray, waxy feeling or "wooden" to the touch

### Effects, such as:

- Dizziness, weakness or blurred vision
- Vigorous shivering
- Lack of coordination and impaired judgment
- Painful, red, watery or gritty feeling in the eyes (snow blindness)

## In enclosed areas where heaters are used ...

- Excessive yawning, cherry red lips or grayish tint to lips and mouth
- Confusion, disorientation or mental slowness
- Drowsiness, lack of coordination or unconsciousness



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## **Appendix 2**

### **Clinical Guidance for Case Classification and Reporting Requirements**

Cold Weather Injuries (CWIs) include both freezing and non-freezing injuries. The guidance provided below is intended to help clinicians distinguish among different types of injury.

#### **1. Freezing Cold Injuries (Frostbite).**

a. First-degree frostbite is an epidermal injury. The affected area is usually limited in extent, involving skin that has had brief contact with very cold air, liquid (e.g., extremely cold fuel) or metal (e.g., touching an outside door handle). Frozen skin is initially a white or yellow plaque. It thaws quickly becoming wheal-like, red, and painful. Since deep tissues are not frozen (though they may be cold) mobility is normal. The affected area may become edematous but does not blister. In 7-10 days, complete clinical healing follows desquamation of frostbitten skin.

b. Second-degree frostbite involves the whole epidermis and may also affect superficial dermis. The initial frozen appearance is the same as in first-degree frostbite. Since freezing involves deeper layers and usually occurs in tissue with prolonged cold exposure, some limitation of motion is present early. Thawing is rapid with return of mobility and pain in affected areas. A bulla, with clear fluid, forms in the injured area over several hours after thawing. Blister fluid is extravasated from the dermis. Usually, the upper layers of dermis are preserved which permits rapid re-epithelialization after injury. Second-degree injuries produce no permanent tissue loss. Healing is complete but takes three to four weeks. Some amount of first-degree injury is frequently present in the immediate vicinity of second-degree frostbite. All other exposed areas should be evaluated for frostbite. Cold sensitivity may persist in injured areas, following second-degree frostbite,

c. Third-degree frostbite involves the dermis to at least the reticular layer. Initially, frozen tissue is stiff and restricts mobility. After thawing, mobility is restored briefly, but affected skin swells rapidly and hemorrhagic bullae develop due to damage of the dermal vascular plexus. Swelling restricts mobility. Significant skin loss follows slowly through mummification and sloughing. Healing is also slow, progressing from adjacent and residual underlying dermis. There may be slight permanent tissue loss. Residual cold sensitivity is common.

d. Fourth-degree frostbite involves full thickness of the skin and underlying tissue, including bone. Initially frozen tissue has no mobility. Thawing restores passive mobility, but intrinsic muscle function is lost. After thawing, reperfusion of skin is poor. Bullae and edema do not develop. The affected area shows early necrotic change. The injury evolves slowly (weeks) to mummification, sloughing, and auto-amputation. Whatever dermal healing occurs is from adjacent skin. Significant permanent anatomic and functional loss is the rule.

e. Corneal frostbite is a rare, but profoundly disabling injury. The evolution is similar to any deep ocular keratitis. Permanent corneal opacification requiring corneal transplant is a common outcome.

2. **Non-Freezing Cold Injuries** (NFCI) can occur when conditions are cold and wet (air temperatures between 32 and 55°F) and hands and feet cannot be kept warm and dry. Chilblain and trench foot are two of the most prominent non-freezing cold injuries.

a. Chilblain is a non-freezing cold injury that, while painful, causes little or no permanent impairment. It appears as red, swollen skin, which is tender, hot to the touch, and may itch. This can worsen to an aching, prickly ("pins and needles") sensation and then numbness. It can develop in only a few hours in skin exposed to cold. Chilblain is no longer a reportable event.

b. Trench foot (immersion foot) is a serious non-freezing cold injury, which develops when feet are exposed to moisture and cold for prolonged periods (twelve hours or longer, usually for many days or weeks). Cold and moisture softens skin, causing tissue loss and infection. Untreated, trench foot may eventually require amputation. Often, the first sign of trench foot is itching, numbness or tingling pain. Later, feet may appear swollen, and the skin mildly red, blue to black. Commonly, trench foot shows a distinct "water-line" coinciding with the water level in the boot. Red or bluish blotches appear on the skin, sometimes with open weeping or bleeding. Risk of this potentially crippling injury is high during wet weather or when troops are deployed in wet areas. Soldiers wearing rubberized or tight-fitting boots are at risk for trench foot regardless of weather conditions, since sweat accumulates inside boots and keeps feet wet.

3. **Hypothermia.** Hypothermia results from reduced core temperature. By definition, hypothermia is considered to be present when "core" temperature (clinically taken to be the same as rectal temperature) is below 95°F (35°C). Hypothermia is:

- *Mild* if temperature is between 89.6°F (32°C) and 95°F
- *Moderately severe* if temperature is between 82°F (28°C) and 89.5°F
- *Profound* if temperature is less than 82°F

Patients with a core temperature of 89.6°F (32°C) or less must be observed carefully for dysrhythmias. Hypothermia is always the product of loss of heat to the environment in excess of the rate of heat production by the body.

#### 4. **Distinguishing among first-degree frostbite, chilblain, and cold sensitivity.**

There is often confusion among practitioners when attempting to distinguish among first-degree frostbite, frostnip, and cold sensitivity. Often patient history is not helpful, so reliance must be placed upon clinical presentation. Consider the following guidance in distinguishing among these syndromes:

a. Clinical evidence of tissue damage (persistent erythema or numbness, edema, desquamation) makes the diagnosis of first-degree frostbite.

b. Frostnip is superficial and does not cause tissue damage.

c. Soldiers with a vasospastic disorder (like Raynaud's Disease) or prior history of CWI may have blanching or numbness upon exposure to cold temperatures, even when wearing appropriate cold weather clothing. This is cold sensitivity and should not be reported as a CWI unless there is evidence of acute tissue injury (edema, desquamation, bullae, etc.).

## **5. Follow-up and profiling of CWIs.**

a. Desquamation and bullae may take up to 72 hours to develop. Practitioners should consider scheduling follow-up visits in 72 hours to reassess injury evolution before diagnosing a cold weather injury.

b. Soldiers with CWI receive a profile IAW AR 40-501 para 3-46.

## **6. Reporting CWIs.**

a. Reporting of CWIs is mandatory. Providers and supporting Preventive Medicine activities will collect appropriate clinical information and report cases within 72 hours through the Reportable Medical Events System (RMES). The Tri-Service Reportable Events list can be downloaded from the Army Medical Surveillance Activity website at the following URL: <http://amsa.army.mil>. Effective May 04, chilblain is no longer a reportable CWI.

b. In the "Comments" section of the report, indicate the following items when appropriate:

- Anatomic location of the injury
- Degree of frostbite
- Core body temperature (for hypothermia cases)
- If injury was duty related
- Circumstances resulting in injury

c. Local Preventive Medicine personnel should coordinate with the local Installation Safety Officer on CWI injury data.

### **Appendix 3**

#### **General Guidance for all Cold-Weather Physical Training (PT)**

1. Responsibilities: Cold Weather Injury prevention is a command responsibility. Unit non-commissioned officers are responsible for the health and safety of their troops and must set the example in how to conduct PT in the cold. Realistically, leadership at all levels, including platoon and squad leaders, need to ensure that Soldiers are compliant with actions to prevent individual cold injuries.

2. PT can be conducted outside during inclement weather. However, leaders should consider conducting PT indoors when severe environmental conditions exist. PT should not be conducted outside under the following conditions:

- a. Extensive ice on roads, which is a potential risk for significant injury.
- b. Limited visibility, due to heavy rain or fog.

3. PT at or below 0°F ambient air temperature or 0°F wind chill is considered high-risk training. The Unit commander should take action under these conditions to consider conducting PT indoors.

4. The Unit commander should seek advice regarding specific additions to the standard PT uniform (e.g., black stocking cap, gloves, balaclava, neck gaiters, etc.) based on weather requirements.

a. First-line leaders should monitor individual uniform modifications in extreme weather.

b. During cold weather, the Army Physical Fitness Uniform (PFU) jacket and pants will be worn. Soldiers traveling to PT are allowed to wear extra clothing, such as the cold weather parka (Gortex jacket) as an outer garment.

c. Minimum cold weather PT uniform guidance should correspond to wind chill categories as below. The PT uniform should be adjusted to avoid over-heating and sweating.

<b>COLD WEATHER RISK</b>	<b>PT UNIFORM GUIDANCE</b>
<b>LITTLE DANGER</b> (Greater than 30 minutes until frostbite)	PFU, jacket and pants, black knit cap, black gloves with inserts, neck gaiter.
<b>INCREASING DANGER</b> (5-30 minutes until frostbite)	PFU, jacket and pants, polypropylene top and bottom, balaclava, trigger finger mittens.
<b>GREAT DANGER</b> (5 minutes or less than 5 minutes until frostbite)	Add ECWCS* Mittens, parka.

\*ECWCS-Extended Cold Weather Clothing System

d. After physical fitness training, appropriate warming and changing facilities need to be provided. Individuals need to change into dry clothing as soon as possible. Fluid losses need to be replenished, preferably with warm, sweet drinks.



# Appendix 4 Wind Chill Temperature Table



## Wind Chill Chart



		Temperature (°F)																	
Wind (mph)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times

30 minutes

10 minutes

5 minutes

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V<sup>0.16</sup>) + 0.4275T(V<sup>0.16</sup>)

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Table 1: Summary of Cold Weather Injuries, By Type of Injury, Active Duty, US Army, 1998-2005\*

	Frostbite		Immersion		Chilblains		Hypothermia		Unspecified		Total	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
<b>Gender</b>												
Male	881	31.26	291	10.32	231	8.20	167	5.93	528	18.73	2098	74.44
Female	342	68.48	50	10.01	100	20.02	28	5.61	258	51.66	778	155.78
Unknown	0	0.00	1	41.64	0	0.00	0	0.00	0	0.00	1	41.64
<b>Age group</b>												
<20	137	49.57	53	19.18	48	17.37	33	11.94	126	45.59	397	143.63
20-29	756	42.38	231	12.95	228	12.78	121	6.78	479	26.85	1815	101.75
30-39	278	29.23	52	5.47	47	4.94	29	3.05	153	16.09	559	58.78
40-49	50	17.77	5	1.78	8	2.84	10	3.55	27	9.60	100	35.54
50-59	2	7.42	1	3.71	0	0.00	2	7.42	1	3.71	6	22.26
60+	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<b>Race/Ethnicity</b>												
White	439	23.08	197	10.36	151	7.94	93	4.89	318	16.72	1198	62.98
Black	618	75.35	86	10.49	134	16.34	74	9.02	343	41.82	1255	153.02
Hispanic	88	28.23	36	11.55	26	8.34	13	4.17	66	21.17	229	73.45
Other	78	27.26	23	8.04	20	6.99	15	5.24	59	20.62	195	68.15
<b>Rank</b>												
E1-4	768	50.05	229	14.92	220	14.34	129	8.41	533	34.74	1879	122.46
E5-9	389	31.22	76	6.10	73	5.86	44	3.53	223	17.90	805	64.62
Officer	66	12.22	37	6.85	38	7.04	22	4.07	30	5.56	193	35.74
<b>Cold year</b>												
1998-1999	230	48.80	45	9.55	23	4.88	29	6.15	98	20.79	425	90.17
1999-2000	164	34.84	57	12.11	44	9.35	25	5.31	308	65.44	598	127.05
2000-2001	179	37.75	56	11.81	50	10.54	40	8.44	105	22.14	430	90.68
2001-2002	170	35.72	33	6.93	47	9.87	23	4.83	74	15.55	347	72.90
2002-2003	162	33.37	60	12.36	63	12.98	35	7.21	74	15.24	394	81.15
2003-2004	168	34.09	48	9.74	40	8.12	27	5.48	57	11.57	340	68.99
2004-2005*	150	33.35	43	9.56	64	14.23	16	3.56	70	15.56	343	76.26
<b>Total</b>	1223	36.83	342	10.30	331	9.97	195	5.87	786	23.67	2877	86.65

\*Through 30 June 2005 (the end of the 2004 - 2005 cold season).  
Source: Defense Medical Surveillance System from July 1998 - June 2005  
Prepared by: Army Medical Surveillance Activity, USACHPPM  
Rates are expressed as cases per 100,000 person-years.